THE CHEMICAL AGE

VOL LVII 15 NOVEMBER 1947 No 1479


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IN THIS ISSUE

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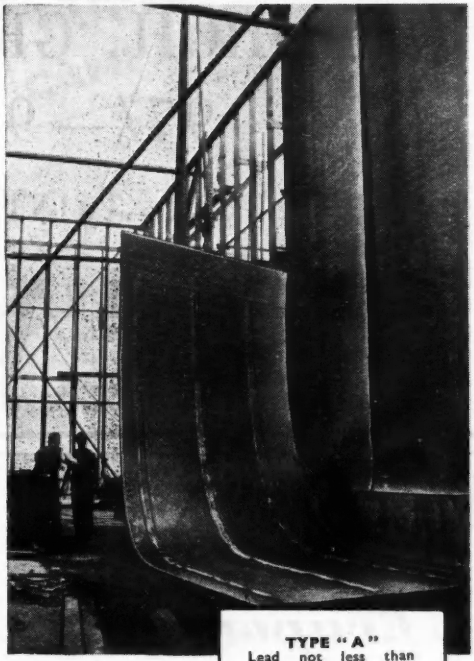

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THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited

VOL. LVII
No. 1479.

15 November 1947

Annual Subscription, 26s.
8d. per copy; post free, 10d.

Harvesting the Sea

THE transition of weed into a useful crop is a fairly familiar form of alchemy and synthetic chemistry has proved more than once its ability to initiate or reverse a process. Seaweed is an example of a weed that has changed its character more than once within living memory. As the principal source of potash and other alkalis it was highly valued in many lands until the Leblanc process drove it from that field. As the reagent in nature's process by which iodine was recovered from seawater it again had a certain value, leading to limited industrial developments, until more profitable chemical processes were found for iodine production.

Under these conditions an entirely fresh outlook was required to inspire the formation some three years ago of the Scottish Seaweed Research Association equipped with a staff of biologists to investigate the growth, yield and conditions of life of the weed, engineers to design methods of harvesting and chemists to analyse it and develop its chemical treatment. Such have been the results of the three years' work that this outcast, termed by Dr. W. A. P. Black in his address to the London Section of the Society of Chemical Industry as "this intriguing weed," may well become the raw material of an organic chemical industry, the potential value of which was assessed by Dr. Black as £15 million a year.

More vegetation grows under the sea than on land. In the sub-littoral area around our coasts between low tide and 10 fathoms depths the growth of seaweed is prolific; around the Orkneys alone there are computed to be 1½ million tons of seaweed. Littoral seaweed is readily cut by hand and a man can harvest 1 cwt. an hour. Sub-littoral weed must be harvested mechanically and as it sinks when cut, the engineering problems of harvesting are considerable.

The extraction processes are not complex. The harvested weed may be extracted with alcohol, and thereby 25 per cent of the whole plant (if harvested in the right months) may be recovered in the form of mannitol, a hexahydrate alcohol of the glycerine group. Containing six .OH groups, it is an excellent starting material for the manufacture of many substances—food products, inks, plastics, medicinal products and explosives among them. Extraction of the weed residue with boiling water then leads to the recovery of laminarin and fucoidin. Laminarin is a glucose polymer, easily hydrolysed, giving a quantitative yield of glucose and therefore an ideal base for foodstuff manufacture; it is used, for example, as a constituent of diabetic flour. Fucoidin, used as a mucilage, is a polysaccharide. Further extraction of the residue with sodium carbonate solution yields a solution of sodium alginate. Alginic acid has a molecular weight of about 200,000 and therefore is an ideal starting point for synthetic fibres, a use to which it was put during the war.

Almost certainly there are many other uses for "this intriguing weed," and much of importance left for Dr. Black and his colleagues to discover. Because we must make the most of all our indigeneous raw materials, ventures such as the Scottish Seaweed Research Association are deserving of all encouragement.

NOTES AND COMMENTS

Soviet Viewpoint

SCIENTIFICALLY, Great Britain is moribund; congresses of scientists run their commonplace course without one cheer from the public at large or a headline in the lay Press, and if any further evidence is needed of the decrepitude of British scientists one need only call to mind " the common dining rooms (in the colleges at Oxford) where professors and students have their meals at plain, heavy tables not covered with anything," or the " strange and comic impression " created by professors attired in their gowns to receive honorary degrees. Rank medievalism! That is not, as might well be assumed, the ill considered account of a child attending a scientific meeting for the first time. It is the presumably studied judgment of Prof. A. Palladin, president of the Ukrainian Academy of Sciences, describing in the Russian *Literary Gazette* the impressions of the Soviet delegation to the International Congress of Physiology, where " quite naturally our papers produced a great impression, for we . . . acquainted our audience with phenomena until then unexplored by scientists." The impression, it seems, would have been more widely received had the delegation not insisted on speaking, in preference to English or French, " the language of the nation which had created the greatest and most advanced form of State in the world." Other Soviet scientists concurrently attending the International Chemical Congress spoke in English or French. " When they heard of our victory they envied us," complacently records this Soviet scientist. "We must never tolerate any kind of toadying to the West."—The tragedy of this farrago is that it emanates from a presumably accredited scientist.

" Rat Race "

FROM another quarter also comes criticism of an English conference, based, however, on grounds which the Soviet spokesman is unlikely to share. In one respect, and it is a most important one—says the U.S. *Chemical and Engineering News*—the recent Congress of Pure and Applied Chemistry held in London was a distinct failure. To the best of our knowledge, only three Russian chemists were present, although France, Italy, Holland, and other countries currently beset with currency exchange difficulties had large delegations present. Why were not more Russian chemists in London? Certainly it was not because of any lack of interest on the part of Soviet Russia in chemistry. Would it not have been much more desirable in view of the present international situation to have omitted one or two of the scientific sessions in favour of an open forum on international relationships from the scientists' viewpoint? If scientists are to have a voice in the shaping of world affairs, then they must be articulate. . . . Must we in the future be content to limit ourselves to reading and listening to scientific papers considered by non-scientists as innocuous? If the answer is no to question one and yes to question two, then we are already in another rat race which will only end when World War III has become history, barring some unforeseeable intervention by the hand of God.

I.C.I. Chemicals

IMPERIAL Chemical Industries, Ltd., is not the beginning and the end of British industrial chemistry, as certain propagandists profess to believe. At its post-war stature, I.C.I. is, however, fit to rank with some entire industries as an integer in the sum of the country's industrial capacity. Twelve thousand men and women, 15 factories, close on 250 products—there are the bare bones of the General Chemicals Division, notes the current issue of the " I.C.I. Magazine " in an illustrated review of the Division; and this, of course, pays no regard to the great ancillary industries which go to make up I.C.I. If it did the magazine might have been mistaken for a Blue Book rather than the lively and well presented piece of literature that it is. The chemical group itself shares the characteristic of a mountain range, the tantalising refusal to show all its members at the same time, and the current survey has the merits of an ordnance map—worth studying because of its intimate bearing on current production problems. Two things emerge very clearly from the I.C.I. article : the war has given a great impetus to the driving force animating this chemical empire, as well as adding substantially to its plants; and the vitality of its research departments in

On Other Pages

fundamental and applied chemistry can hardly fail to initiate in years to come developments as phenomenal as the past two decades have witnessed. One thing alone could reduce it to impotence. The history of the coal mining industry since 1946 seems now to have rendered that danger more remote.

Incentives

A NEW kind of exhibition has been staged at Cefn Mawr by Monsanto Chemicals, Ltd. The firm, which has transformed the industrial complexion of the district, has set out to show the people of the neighbourhood how the chemicals produced by local workers are essential to the prosperity of the country. Employed there are some 1400 men, as many as were previously occupied in coal mines, which are now closed. An export chart showed that 80 per cent of the products are exported and that if a certain product exported to America last year had been paid for in wheat, it would have provided for one year the bread ration of the population of Wrexham and East Denbighshire. The exhibition was opened on November 5 by Mr. H. T. Edwards, Shotton, who said he was proud of the relationship that existed between the firm and the trade unions. "I have never yet failed to find them receptive to new ideas," he said. "We are worried to-day about incentives. I hope this excellent feeling will carry us through the crisis." The problem, said Mr. Edwards, was a common one for the management and the men. The firm had already exceeded its export target, which had helped materially to earn dollars. Mr. E. A. O'Neal, managing director, and Mr. N. F. Patterson, works manager, both acknowledged the collaboration of the trade union representatives and the workers, and expressed the hope that they would all go forward together with energy and vigour to increase production and make their contribution to the prosperity of the country. That, we suggest, is typical of leadership and integration in the production field, in which the record of larger-scale chemical undertakings is in marked contrast to the troubled affairs of some other key industries.

DRIED EGG TESTING

SUCCESSFUL instrumental testing of bulk dried egg deliveries during the war years was described by Mr. F. W. F. Hansen, of the Torry Research Station, Aberdeen, and formerly with the Government Chemistry Department in Liverpool, when he spoke to the Aberdeen Business and Professional Club last week. When first deliveries were received, analysts had to start from scratch to devise testing methods. Research men discovered that a grain moisture heater could be used with success on dried egg. Old meat boxes were utilised in the construction of apparatus needed for fluorescence testing as a guide to solubility, and it was finally possible to eliminate testing altogether and to sample up to 2000 tests per day, thus enabling the Ministry of Food to sort out and allocate dried egg according to requirements.

Record Oil Output.—Anglo-Iranian Oil Company's output for August amounted to 2,056,000 tons (a new record) which compares with 1,910,000 tons in July, and 1,821,000 tons in June.

Exchange of Students

Ten Continental Countries Participating

THE international exchange of technical students initiated in 1946 by the Imperial College, London, under its vacation work scheme in collaboration with the British Council and certain Continental and Scandinavian universities and technical colleges will hold a conference of the organisers at the Imperial College from January 5-9, 1948.

This exchange provides students with eight weeks' practical experience during the summer vacations under industrial conditions in a foreign country, with opportunities of living as well as working with the peoples of other nations.

Co-operation from Industry

The objects of the forthcoming conference are: (a) To review the exchanges made in 1947 when 220 students took part between Great Britain and Continental and Scandinavian countries. (A number of exchanges were also arranged between the other countries.) (b) To formulate the standards of knowledge, training and experience which are desirable for students taking part. (c) To obtain the co-operation of industry, in the countries concerned, for the provision of practical experience with sufficient emoluments to enable students to meet their cost of living expenses. (d) To arrange exchanges for 1948.

The observations of and on the students taking part in the exchange in 1947 are very encouraging, states the Imperial College, and it is to be hoped that industrial organisations will appreciate the mutual advantages to be gained by a further development of this exchange and come forward with their helpful co-operation for the summer of 1948.

Representatives of the undernamed countries have accepted preliminary invitations to attend: Belgium (Brussels University or Comite Interuniversitaire pour l'organisation des stages Industrials); Czechoslovakia (University of Prague); Denmark (Technical High School, Copenhagen); Finland (Technical High School, Helsinki); France —Ministry of Education (Direction de l'Enseignement Technique); Great Britain (Imperial College); Holland (Technical High School, Delft); Norway (Technical High School, Trondheim); Sweden (Svenska Industriens Praktiknamed; Technical High School, Stockholm; Chalmers Institute, Goteberg); Switzerland (E.T.H., Zurich).

Franco-Swedish Trade.—A recently signed trade agreement between France and Sweden provides *inter alia* for the shipment of crude phosphates and soda products from France, against iron and steel manufactures and paper pulp.

Dutch Trading Group

Export-Import Office Established

FURTHER news of the recently established Dutch Sales Office for Chemicals (Nederlands Verkoopskantoor voor Chemische Producten) indicates that its members are: State Mines, Sulphuric Acid Co., Ketjen, Dutch Salt Industry, Mekog, and the Mining Co., Aime. The organisation has been formed for the purpose of greater economy in the disposal of Dutch chemicals abroad as well as facilitating imports of chemicals not at present manufactured by the firms named. A centralised sales policy will also apply for the Dutch market. Omitted from the scheme are fertilisers and ammonia (State Mines), salt (Salt Industry) and fertilisers (Mekog).

Shares of the Zwanenberg-Organon Co., in whose laboratories there have recently been important developments in the production of vitamin A, are being offered on the Amsterdam Stock Exchange in order to obtain additional capital to enable the company to carry through its expansion programme and to pay off bank credits. This company also produces hormones, liver and vitamin specialties, and was the first industrial producer of insulin on the Continent. Its new factory for DDT and DDT products at Boxtel will soon be ready.

Dutch Source of Cheaper Plastics ?

A new group of raw materials, so far not described in scientific literature, which are claimed to make cheaper the manufacture of plastics, has been found by the laboratories of applied natural science at Delft, Holland, according to the American *Product Engineering*. The new product resembles methacrylate, according to Dr. L. C. Stoutjesdyk, manager of the Plastics Institute of Delft, the magazine reports, and it is claimed it will be possible to produce plastics with highly divergent properties. For instance, the surface hardness can be varied. Dr. Stoutjesdyk stated that existing Dutch industries would find no difficulty in switching to the production of these compounds.

Canada Needs Scientists.—Shortage of scientists is "seriously affecting" Canada's research programme, including atomic development at the Chalk River, Ontario, project. This is indicated by Mr. F. H. Sanders, technical assistant to president C. J. Mackenzie of the National Research Council, who says: "that even the added glamour of working on the Chalk River atomic pile has not been enough to enable us to fill our establishment." At the Research Council itself important projects were being held up for lack of trained personnel.

CHEMICAL INDUSTRY IN AUTUMN

Continued Rise in Employment Totals

EVIDENCE that the tide of employment in chemical industry continues to rise, latterly at a somewhat accelerated rate, is one of the significant facts contained in the October issue of the Central Statistical Office's *Monthly Digest of Statistics* (H.M.S.O., 2s. 6d. net).

Although the figures in this and several other sections of the review take account only of changes up to August last, since when it is reasonable to expect even larger accretions to the labour force have taken place, an overall increase of 2000 is reflected in the August total of 354,000 workers making chemicals, explosives, paints, oils, etc. This is by far the largest increase since the April recovery from a marked reduction in the previous month and is, of course, the highest level reached since the end of war production in 1945.

Although the number of women in the chemical industry (181,100) contributed a further 300 to the general recruitment, the preponderance of male workers (235,900) was more marked than hitherto. Of all workers, 288,400 were employed on home and supply department manufactures and 65,600 (against 64,000 in July) for the export market.

Among the more noteworthy changes in production totals, summarised in the table below, was the improvement in September in the fluctuating totals of sulphuric acid to 107,600 tons (compared with 103,600 tons in August). This figure is, however, still substantially lower than the average monthly production since the beginning of the year. This is associated with the sharp seasonal reduction in consumption between July and August—from 113,000 to 102,000 tons. Stocks of acid reached the unusually low level of 56,000 tons in September, pyrites was also scarcer, but spent oxide stocks (81,200 tons) were heavier than in any month since the war.

No very wide fluctuation is observable in the figures for fertilisers, production and stocks as a whole remaining steady, although production of superphosphate and compound fertilisers is still well below the level of recent years.

Shale Mining Prospects

Improved Conditions and Output

THE recent introduction of better wage scales in the Scottish shale mining industry, and the granting of better working conditions and paid holidays have had the effect of increasing production. Output is now 8 to 10 per cent higher than it was before the holidays and workers' tendency to drift away from the industry is believed to have ceased, not so much because of the Control of Engagement Order as from a general appreciation of conditions. The industry is hoping for an exemption order to prevent the call-up of its young miners, who it feels should be exempted on the same grounds as coal miners. A standstill order has just been issued, and a final decision is expected soon.

The first party of European volunteer workers to start work in Scottish shale mines is now staying at a hostel at Armadale. Numbering 43, they are mainly Latvians and Estonians from the displaced persons' camp at Lubeck, in Germany. Poles are also to be employed in the shale mines and a party of 23 will shortly arrive at the Forth Hostel, Lanark.

CHEMICAL PRODUCTION AND USES—AUGUST AND SEPTEMBER

	July, 1947 Thousand tons			July, 1946 Thousand tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	107.6	102*	56	106	110	57.2
Sulphur	—	17.6	81.2	—	16.8	90.5
Pyrites	—	14.9	71	—	15.3	71
Spent oxide	—	14.8	155.2	—	14.7	138.1
Molasses†	6.9	30.8*	137.2	5	34.5*	136.6
Industrial alcohol (million bulk galls.)	2.07	2.15	5.48	2.20	34.5	1.33
Superphosphate†	63.7	66	106.1	74.7	80.5	114.2
Compound fertilisers†	105	68.5	141.5	102.8	76.6	237.2
Agricultural lime	—	223.9	—	—	259	—
Ammonia	—	5.92	3.52†	—	6.02	4.32
Phosphate rock (agricultural)† ...	—	54.5	136.2	—	59.3	119.7
Phosphate rock (industrial) ...	—	58.7	35.8	—	4.29	38.8
Virgin aluminium†	2.21	12.2	—	2.25	12.1	—
Magnesium†	0.12	0.24	—	0.09	0.20	—
Virgin copper†	—	26.7	102.3	—	25	85.1
Virgin zinc†	—	16.7	34.4	—	16.7	61.3
Refined lead†	—	16.9	42.2	—	16.1	27.1
Tin†	—	1.89	17	—	2.13	22.1
Zinc concentrates†	—	13.5	64	—	11.6	118

* Distilling only † August

India's Chemical Blue-Print

INDIA can become self-sufficient in regard to fine chemicals, drugs and pharmaceuticals within a period of 15 years, according to the report submitted by the panel on the industry set up by the Government of India under the chairmanship of Col. R. N. Chopra.

The panel feels that the proper development of the fine chemicals and drugs leading to self-sufficiency ultimately would depend very much on working out a well-balanced and integrated plan for the production of heavy chemicals, coal distillation products, organic solvents, etc. Further, as the production of these materials is also necessary for the production of dye-stuffs, artificial fibre, plastic, synthetic rubber, etc., a workable programme can be drawn up only by integrating the reports of the panels on these different industries.

Among the heavy chemicals, the manufacture of three items, *i.e.*, chloro-sulphonic acid, sodium and chlorides of phosphorus, is very important and may be taken up without delay and the production of intermediates from coal distillation products, such as aniline, acetanilide, chloro-benzene, phenol-diethylaniline para-anisidine, para-nitrotoluene, phthalic acid and anhydride, etc., deserves prompt attention. Also, special efforts should be made to produce refined pyridine, which is essential for the manufacture of sulpha drugs.

Among solvents, India produces ethyl-alcohol in good quantities at competitive prices. Acetone is being produced at one of the ordnance factories. If the production of acetone in the factory, where it is not required for making explosives, is kept up, the needs of the drug industry will be met to a great extent. Immediate arrangements should, meanwhile, be made for the manufacture of other solvents such as acetic acid, butyl and amyl alcohols and also of ethylene oxide, which is a valuable intermediate.

Production of Essential Drugs

Steps should also be taken for the manufacture of requisite quantities of lactose, thourea and guanidine nitrate, the first of which is required for the manufacture of penicillin and the second and third for the manufacture of sulpha drugs.

The production of essential drugs, says the report, should not wait on the production of basic chemicals in the country. The country should, on the other hand, immediately start with the manufacture, utilising the raw materials already available and importing those not available until national resources are developed.

The panel recommend that the production of two types of drugs should be taken in hand immediately, viz., (1) those which are essential for guarding the health of the public and warding off infectious diseases, (2) those for which India already has or can easily develop raw materials in abundance. Under the first category come the sulpha drugs, anti-malaria drugs (quinine, mepacrine, pamaguine, paludrine), penicillin and streptomycin. The arsenicals and DDT can also be included in this list. In the second group come the drugs of vegetable origin. Products such as quinine, emetin, morphine, caffeine, ephedrine, santonin and essential oils, etc., should be developed to the fullest possible extent, both for the needs of the country and for export. In this group, the biologicals, vaccines and sera, liver extracts, glandular products, etc., may be included. Production of insulin on a commercial scale should also be taken up.

Prospects for Shark Oil

Pointing out the scope which exists for the expansion of the shark liver oil industry, the report recommends that a Central Board, representing the relevant departments of the Government of India, the Departments of Fisheries of the different maritime Provinces and non-official experts, with a whole time executive, should be formed to work out the necessary steps to put the shark liver oil industry on a firm and permanent basis.

Discussing the general policy of the State in regard to the fine chemical industry, the panel suggest that in the manufacture of new and vitally important drugs like penicillin, streptomycin, mepacrine, sulpha drugs, etc., the State should take up the initiative at least in setting up model plants and training personnel. They plead for remission on customs duty for the first five years on raw materials and semi-manufactured goods required for the industry and for making excise policy throughout India uniform. They also urge the revision of railway freight rates.

The report contains appendices written by experts on a number of special problems related to the industry, like machinery, equipment, manufacture of penicillin and of sulpha drugs, shark liver oil, etc.

Effect of Wagon Shortage

Steel production in the Tees area was reported last week to have been hampered by non-clearance of stocks consequent upon a serious rail transport shortage. At the Cleveland Iron & Steel Works where normally not more than 20,000 tons should have accumulated, there were 33,000 tons representing a week's output. One estimate puts the wagon shortage at 1000 a week. Incoming raw materials may soon be affected.

A STANDARDISED pH SCALE

U.S. Standard Bureau's Bid for Uniformity

BECAUSE there is an increasing need in science and industry for accurate determinations of acidity, the U.S. National Bureau of Standards has announced its advocacy of the universal adoption of a single standard *p*H scale, similar to the International Temperature Scale, in place of the several *p*H scales, based upon various definitions, now used by chemists. It is proposed that the *p*H assigned to solutions of buffer substances distributed by the Bureau as standard samples should be taken as the fixed points on this standard scale.

In the preparation of many commercial products, such as paper, textiles, dyes, ceramics, and beer, the rapidity and efficiency of the processes depend upon accurate control of the acidity or alkalinity of aqueous solutions. Such control is now a regulatory requirement in the preparation of certain medicines and in the manufacture of paper and leather for the U.S. Government. Another application of particular importance is the avoidance of corrosion and embrittlement of boiler walls and tubes by regulation of the acidity of boiler water. The widespread losses due to underground corrosion are likewise effectively curbed in many cases by proper adjustment of acidity.

The several convenient *p*H meters now available commercially enable precise determination of *p*H values in such varied media to be made with ease and rapidity, but these values are based upon a scale fixed by the *p*H assigned to the standards with which the instrument has been calibrated.

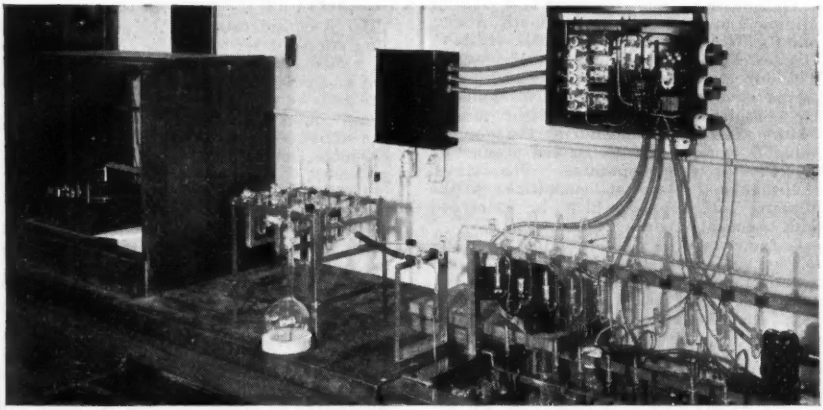
The differences among scales of *p*H are the direct result of different procedures, different definitions and different assumptions employed in arriving at the *p*H of the standard. The *p*H may be defined in one instance as the negative logarithm of the hydrogen-ion concentration or, again, of the effective concentration or "activity" of this ion. Often the *p*H value as defined by Sorenson in terms of the electromotive force of a galvanic cell with hydrogen and calomel electrodes is chosen. Although the differences among these scales rarely exceed 0.1 unit, the need for greater accuracy makes desirable the general adoption of a single series of consistent *p*H standards.

Uniform Samples

In an effort to encourage standard procedure in *p*H measurements, the National Bureau of Standards is now supplying four buffer materials in the form of samples of certified purity. These substances are acid potassium phthalate, potassium dihydrogen phosphate and disedium hydrogen phosphate (intended to be used together), and borax. They are being distributed at the rate of several hundred samples annually. The certificates furnished with these compounds specify the *p*H of certain aqueous solutions of the sample, which can provide fixed points on a *p*H scale.

In order to assign exact values to these fixed points, it was necessary to set up a scale based upon some suitable definition of

(*Continued on page* 646)



Bureau of Standards equipment for ascertaining E./M. force data and assigning pH values to solutions of standard buffer materials: in the foreground are the test solutions in glass cells and left is a potentiometer

Research Company's Plan

Financial and Material Aid for Inventors

AMALGAMATED Research and Development Company is the name of an organisation recently formed to promote co-operation between industry and inventors. Its purpose is to develop new ideas and processes with a view to reaching production stages more rapidly than is usually the case when inventors work independently. Inventors are to be encouraged to bring their ideas to A.R.D.C. whose experts will examine them with a view to their exploitation.

The company states that its services are three-fold, viz. :—financial assistance; provision of facilities for development (laboratories, equipment, materials, etc.); and marketing. "It is proposed," said the commercial manager (Mr. A. M. T. Tucker) to THE CHEMICAL AGE last week, "to draw up agreements with inventors as soon as it seems to us that their ideas have a commercial future. A number of agreements are already in existence. Sometimes we hear from people who are interested only in finance, but more frequently it is facilities for research that they lack. One man who came to us recently with a new decorative and protective finish for light alloys involving the use of cellulose acetate, preferred to use his own laboratory. We have therefore made a temporary arrangement whereby we employ him at a salary and at the same time pay him a rent for the use of his laboratory."

Wartime Research

Sponsors of the project are Associated British Engineering, Ltd., Dawnay Day & Co., Industrial Bankers, Ltd., and General Mining Industries, Ltd., of South Africa, and its directors Messrs. R. P. Fraser, A. C. Geddes, C. L. Hill, and J. M. Hopkinson. The project is understood to have been conceived by Mr. Fraser, a chemical engineering consultant, who has specialised in combustion technology, and during the war did valuable work in the design and production of flame-throwing apparatus. He is still chairman of a special committee of the Ministry of Supply which is concerned with chemical warfare.

In the company's view, inventors' facilities in the past, have been too few and not generally known or readily accessible to individuals. Too many sound innovations have been pigeon-holed or rejected by their originators owing to lack of suitable expert counsel. This is a defect which A.R.D.C. hopes to remedy. Already considerable progress has been made in the fields of chemicals and chemical engineering, the latter department being located at Causeway Works, Staines, Middlesex. A.R.D.C.'s H.Q. being at 32 Duke Street, St. James', S.W.1.

Official Notices

Industrial Sugar Cut.—The reduction by 25 per cent of the total allocations of sugar for manufacturing purposes, which is one of the Government's measures to save dollar expenditure on food, will take effect from January 4, 1948.

Aluminium Increase.—The Ministry of Supply announces that the price of aluminium in notch bar form has been increased from £80 to £82 10s. per long ton delivered to consumers' works.

Exports of Soap.—The Ministry of Food will allocate additional oils and fats for the manufacture of soap for export to the following markets :—Australia, Formosa, Iran, Liberia, Newfoundland, New Zealand, North, Central and South America, but excluding the European Colonies, Philippine Islands, Portugal and its Colonies, South Africa, Sweden, Switzerland, and U.S.S.R.

Applications for export licences should be made to the Secretary, The Soap Trade Export Group, Wood Street, Bebington, Cheshire. Licences will be valid for three months.

Prices of Oils and Fats.—There will be no change in the prices of unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users during the four-week period ending November 29.

The Ministry of Food announces that no changes will be made in the prices of refined oils and imported edible animal fats in wholesaler quantities during the eight-week period ending January 3.

STANDARDISED pH SCALE—*Continued from page 645*

*p*H. A consideration of the advantages and limitations of several scales led to a choice of a modified activity scale as most convenient and practical for general use. Although the activity of a single ionic species can be simply defined only in very dilute solutions, the influence of the hydrogen-ion activity in chemical equilibria is of far-reaching importance.

The *p*H of the Bureau standards is derived from measurement of the electromotive force of cells without liquid junction, in which they are used as electrolytes. These cells are specially designed, utilising the highly reproducible hydrogen and silver-silver chloride electrodes. Computation of *p*H is based upon several reasonable assumed relationships between ionic activities and mean activities. These assumptions are found to give identical values for dilute solutions. The scale thus obtained approaches a true scale of activity for solutions of low concentration; at higher ionic strengths it is best regarded as a consistent scale which necessarily rests upon an assumption not subject to experimental proof.

Model Safety Rules

Revised Version Ready for Publication

THE Association of British Chemical Manufacturers has announced that Part I of the Model Safety Rules for Use in Chemical Works, the revision of which has been in the hands of a representative body of experts for some time, is now ready for publication and will shortly be generally released.

Making the announcement, the association recalls that Part I of the Model Rules was first issued in provisional form in 1929. The second edition was issued in April, 1938, to take account of the Factories Act, 1937. Since 1938 there have been far-reaching advances in chemical technology.

Joint Responsibilities

The council of the association regards it as essential that safe working conditions shall keep pace with technical improvements in order that the industry shall offer attractive and congenial employment. The whole problem was accordingly considered by a joint committee of the Association of British Chemical Manufacturers and the Association of Chemical and Allied Employers.

It was agreed that the A.B.C.M. should resume and extend its pre-war activities in the field of safety in its technical aspects, and that A.C. & A.E. should deal with personnel and welfare matters, each association giving full support and assistance to the other.

The council accordingly appointed in 1946 a new Works Safety Committee to carry out an extensive programme of safety work. The revision of Part I of the Safety Rules for use in Chemical Works was undertaken as a matter of the first importance. The rules have been revised and extended to incorporate the various changes in legislation and experience gained in their use. They have been perused by the Chief Inspector of Factories, who commends them as worthy of the most careful consideration by all concerned.

Part I has been revised under the general supervision of the Works Safety Committee of the association by the following panel of the Works Safety Committee: Chairman, Dr. W. E. de B. Diamond (British Plastics Federation), Mr. S. E. Chaloner (Monsanto Chemicals, Ltd.), Mr. W. H. Harris (Boots Pure Drug Co., Ltd.), and Mr. G. G. Sutherland (Imperial Chemical Industries, Ltd.).

Copies of Part I will be vailable to non-members of the association at 7s. 6d. per copy, post free. Orders should be addressed to the association at 166 Piccadilly, London, W.1.

PARLIAMENTARY TOPICS

D.S.I.R. "Ceiling."—Asked by Mr. I. Mikardo to define the financial and establishment ceilings imposed by the Treasury on the Department of Scientific and Industrial Research, Mr. Herbert Morrison (Lord President of the Council) said no financial ceiling had been imposed on the D.S.I.R. A staff ceiling had been prescribed which permitted an increase of the non-industrial staff of the Department by approximately 25 per cent above the total of such staff employed on January 1, 1947. In fixing this ceiling as a limit within which the Department should be authorised to work until further notice, the Government gave full weight to the importance of the development of scientific research for the benefit of industry and the community in general and for assisting in the moulding of administrative policy, bearing in mind also the acute shortage of scientific man-power and the necessity for avoidance of measures which might result in disproportionate use of such man-power in industry, Government and the universities.

Carbon black, the shortage of which earlier in the year had restricted tyre production, was in much better supply in September when consumption of rubber was the highest recorded. Although carbon black stocks had been increasing, estimated deliveries for the immediate future were not so good as in recent months.—Mr. Belcher (Parliamentary Secretary to the Board of Trade).

Soda ash, for which there are essential prior industrial demands, is being allocated to manufacturers in accordance with 1946 levels. The soda ash industry is working to full capacity, and distribution is being carried out as effectively as possible.—Mr. Belcher.

Plantation rubber is a commodity which the Government "has well in mind" as an earner of dollars. As to whether it would be possible to invite the U.S. Government to increase its purchases of rubber to offset supplies of tobacco and lard from the U.S.A., no further statement can be made at the moment.—Mr. Belcher.

IRON COMPOUNDS AND PHOSPHATIC FERTILISERS

THEIR EFFECTS IN PRODUCTION AND USE

by H. W. Lehrecke, Ph.D.

THE compounds of iron with phosphoric acid play an important rôle in the chemistry of phosphoric acid fertilisers. Their presence in these fertilisers, especially in superphosphate, is the primary cause of the fact that part of the P_2O_5 present is not water-soluble, but only soluble in an ammoniacal solution of citrate of ammonia (so called Petermann-solution). These "citrate-soluble" compounds are, it is true, available for the roots of the plants as long as they are freshly formed, but the "citrate-solubility" diminishes during storage and under the influence of elevated temperature.

The water-soluble compounds of phosphoric acid which are introduced into the soil in the form of powdered or small-grained phosphoric acid fertilisers, combine rapidly—especially in acid soils—with the ions of trivalent iron (and aluminium) present in the soil, forming combinations which are insoluble in water but citrate-soluble. These compounds also lose their citrate-solubility after some time, especially under the influence of drought and elevated temperature (radiation of the sun on the soil-surface).

Granulated Fertiliser

In spite of this rapid transformation in the soil of the water-soluble phosphoric acid from ordinary phosphatic fertilisers into compounds which are insoluble in water but citrate-soluble, the most important of these fertilisers, *i.e.*, superphosphate, is, in many countries, regularly sold according to its content of water-soluble phosphoric acid, nothing being paid for that part of the phosphoric acid which is only citrate-soluble. As long as superphosphate is produced in the ordinary powder-form, this evaluation lacks any theoretical justification. The situation, however, will change fundamentally if the use of granulated superphosphate increases.

This form of superphosphate offers the important advantages that the granules can be placed at the most favourable depth and situation in relation to the roots of the plants, and that a zone around the granules is formed in the soil in which the water-soluble phosphoric acid emanating from the interior of the grains can no longer be transformed into compounds insoluble in water, all ions of iron (and aluminium) being fixed before by the phosphoric acid primarily diffusing from the surface of the grains. In this way the roots of the plants meet a zone of easily available water-soluble phosphoric acid around the granules of superphosphate.

Evidently the consequence of an increased use of granulated superphosphate will be a strengthened demand for water-solubility of its P_2O_5-content. Therefore, it is possible that those countries where the content of "available" phosphoric acid in phosphatic fertilisers is determined as water- and citrate-soluble P_2O_5, will return to the standard of water-solubility exclusively. The consequence will be that the manufacturer of superphosphate must make greater efforts to avoid the formation of only citrate-soluble compounds of phosphoric acid. As already emphasised, the formation of phosphates of iron plays the most important part in this connection.

From the foregoing it is evident that the chemistry of these compounds deserves increasing attention from the manufacturer as well as from the agricultural chemist.

Two Forms

It is natural that in this connection the compounds of trivalent iron with phosphoric acid are of greater importance than those of iron in the divalent form. Oxygen from the air is present during the manufacture and storage of superphosphates as well as near the surface of the soil where the fertiliser is applied, so that the transformation of divalent iron into the trivalent form readily occurs.

A certain part of the content of iron in superphosphates, it is true, remains in the divalent form during storage, the access of oxygen from the air being impeded by the compact structure of the heap. This form of iron phosphate, however, has no influence as such on the evaluation and the fertilising effect of the product, as the divalent form of iron rapidly turns into the trivalent on coming into contact with the soil solution.

The same is manifest when analysing the soluble phosphoric acid in superphosphates: the divalent iron rapidly changes into the trivalent form during the extraction of the sample with water or with a solution of ammonium citrate[1]. Thus, the only compounds of iron with phosphoric acid we have to deal with in practice are those of trivalent

iron. The following work concerns these compounds only.

Ferric phosphate, $FePO_4 2H_2O$, as will be shown, can be obtained in two different forms, a colloidal or amorphous one and a crystalline one. The colloidal variety is formed in very dilute solutions containing ions of Fe . . . and PO_4 ′ ′ ′, when the *p*H of the solution mounts to 2 or higher.[2]

The total analysis and the isoelectric point of the colloid changes by adsorption and hydrolysis.[3] When precipitating it from dilute solutions, the molecular ratio between PO_4 and Fe attains the full theoretical value for $FePO_4$ only if a considerable excess of PO_4 ions is present. The composition depends upon the *p*H during precipitation, the ratio between PO_4 ′ ′ ′ and Fe . . . in the solution and, to some extent, upon the degree of dilution. Increasing the *p*H of the solution results in precipitates with a lower proportion between PO_4 and Fe than one.[2] This is the result of an increasing hydrolysis, whereby PO_4 passes into the solution, and a corresponding quantity of Fe remains in the precipitate as $Fe(OH)_3$. When the *p*H attains a value of 7.1 this hydrolysis becomes complete.

Amorphous Ferric Phosphate

Amorphous ferric phosphate can be obtained in the form of a yellowish precipitate by reaction between a solution of an iron salt, *e.g.*, iron chloride or sulphate, and a solution of a secondary phosphate, *e.g.*, disodium or diammonium phosphate. Using relatively concentrated solutions, containing *e.g.*, one mole. of salt per litre, ferric phosphate with the theoretical composition is precipitated from equivalent quantities of the solutions at a *p*H between 2 and 6. Using solutions of iron salts with lower concentration, such as normal solutions, an excess of approximately twice the theoretical quantity of PO_4 ′ ′ ′ ions is necessary in order to obtain the theoretical composition of $FePO_4$ in the precipitate. Without this excess its content of PO_4 will be too low.[1]

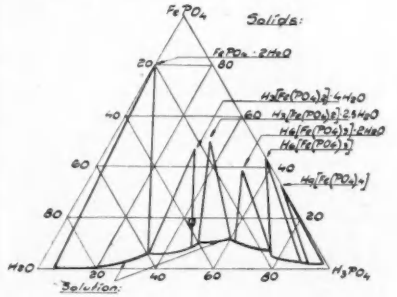


Fig. 1. The system $FePO_4$ — H_3PO_4 — H_2O at 40°C.

The amorphous ferric phosphate obtained in this way always contains a considerable quantity of colloid-bound water which is difficult to remove by drying without altering the colloidal state.

The colloidal modification of ferric phosphate is labile and turns into a crystalline form under the influence of heat. This property of ferric phosphate of forming an amorphous modification is unique among all compounds of trivalent iron with phosphoric acid and of great importance with respect to the question of solubility (see later) and availability for the plants. All other stoichiometrical combinations between trivalent iron and phosphoric acid are crystalline only.

The crystalline modification of ferric phosphate can, as mentioned above, be obtained indirectly by crystallisation of the amorphous modification formed primarily by rapid precipitation from weakly acid solutions. It can, however, also be obtained directly by slow crystallisation from phosphoric acid solutions of between 5 and 35 per cent H_3PO_4, which are supersaturated with regard to iron. Another way to obtain the crystalline modification of ferric phosphate, which is described in detail later on, consists in its precipitation from a solution of the amorphous modification in phosphoric acid by dilution with a certain amount of water. The ferric phosphate is obtained in the form of small light rose-coloured crystals.

Here we have an analogy to the phenomena observed by Haber[5] during the formation of the hydroxides of iron and alumina. Depending upon the conditions of their formation, either amorphous sols or crystalline precipitates are obtained. The cause for this different behaviour cannot only consist in the rapidity of formation of the insoluble compounds in question, but must also be sought in surface-phenomena (adsorption) which impede the primary particles from growing to larger crystallites, while they may cling loosely together, forming disordered agglomerates.

Three Phenomena

If we consider the other compounds of trivalent iron with phosphoric acid, we find three remarkable phenomena:

1. There exist no compounds corresponding to the normal type of secondary or primary phosphates, as $Fe(H_2PO_4)_3$ or $Fe_2(HPO_4)_3$.
2. All these other compounds are, however, complex acids, iron forming the central atom with a different number of coordinated PO_4 groups in the complex.
3. All these combinations are crystalline only.

(*Continued overleaf*)

India's Surplus Alcohol

Compulsory Use to Safeguard Industry

PURSUING the general policy for the development of industries, the Government of India set up a panel to make recommendations regarding the development of the sugar, alcohol and food yeast industries during the post-war period. The most important recommendation made by this panel in respect of the power alcohol industry is the compulsory admixture of petrol with power alcohol in the proportion of 80 : 20. The recommendation is that the admixture should be made compulsory and gradually enforced throughout the country.

Wartime Industry

Before the war, India used to obtain about threequarters of her requirements of petrol from Burma. With the fall of Burma in 1942, India lost an important source of supply, and the Government of India encouraged the production of power alcohol as a substitute for petrol, and several distilleries were accordingly established during the years 1942 to 1944, particularly in the United Provinces and Bihar. Now that larger supplies of imported petrol are likely to be available at rates cheaper than those of power alcohol, these distilleries are threatened with extinction. The Government of India does not propose to allow such a situation to develop for two main reasons.

First, the maintenance of the power alcohol industry as an alternative source of supply of motor fuel would be of considerable strategic importance in times of national emergency. Second, as one of the biggest sugar-producing countries in the world, India manufactures about 400,000 tons of molasses as by-product every year. Of this quantity about 150,000 tons are utilised for the manufacture of rectified spirit, methylated spirit, etc.; for the balance of 250,000 tons no permanent satisfactory use has been found.

This surplus will increase when new sugar factories come into production in furtherance of the general development plans. It would be in the national interest if surplus molasses, instead of being allowed to go to waste, were utilised for the production of power alcohol. This will not only mean the building up of a new industry but will ultimately reduce the price of sugar. It is estimated that if power alcohol is used in admixture with petrol in the proportion of 20 : 80, the price of the mixture will exceed the price of petrol by only a little more than one anna per gallon.

IRON COMPOUNDS (*Continued from page 649*)

The following combinations have been described[6]:—

(a) $H_3[Fe(PO_4)_2].\ 4H_2O$: diphosphatoferric acid, whitish-yellow.
(b) $H_3[Fe(PO_4)_2].\ 2.5H_2O$: diphosphatoferric acid, rose-coloured.
(c) $H_6[Fe(PO_4)_2].\ 2H_2O$: triphosphatoferric acid, light rose-coloured.
(d) $H_6[Fe(PO_4)_2]$: triphosphatoferric acid, light rose-coloured (hygroscopic).
(e) $H_9[Fe(PO_4)_4]$: tetraphosphatoferric acid, colourless (hygroscopic).

These compounds precipitate slowly from solutions containing H_3PO_4 and Fe at concentrations which result from the isotherm at 40°C. published by Bailer[7] and reproduced in Fig. 1.

The fact that all these combinations are complexes made Carter and Hartshorne as well as Bailer believe that ferric phosphate $FePO_4.2H_2O$ is also a complex compound, *i.e.*, the iron salt of diphosphatoferric acid, corresponding to the formula :—

$$Fe[Fe(PO_4)_2].4H_2O.$$

Because of the insolubility of ferric phosphate in water this question could not be decided by ordinary methods. With the help of an X-ray powder-diagram, however, it was possible to prove that $FePO_4.2H_2O$ cannot be an iron salt of diphosphatoferric acid but must be regarded as an ordinary salt of orthophosphoric acid (see later on).

In the liquid phase of phosphoric acid fertilisers (superphosphate) the conditions of concentration and temperature are such that only the crystalline form of ferric phosphate or diphosphatoferric acid with 4 or 2.5 molecules of water of crystallisation can exist.

For this reason the following work has been restricted to the conditions of formation and to the properties of these three compounds, *i.e.*, amorphous ferric phosphate, crystalline ferric phosphate, and diphosphatoferric acid.

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(*To be continued*)

I.C.I. CHEMICALS DIVISION

12,000 WORKERS AT 15 FACTORIES

FEW people in chemical industry could undertake to define offhand the scope and the numerous establishments which Imperial Chemical Industries, Ltd., controls. Several writers appear to have collaborated to provide, in the November number of the "I.C.I. Magazine" a fairly comprehensive study of the I.C.I's General Chemicals Division alone, and were hard put to it to compress into five pages of text and pictures an adequate mention of each of the division's ten principal factories and the purposes they serve.

250 Principal Products

General Chemicals embraces in all 12,000 men and women, fifteen factories and produces some 250 principal products. The structure of which these are the bare bones —says the review—is a complex one—inevitably so in a design subjected to so many diverse influences. Examples of these are the location of nine factories in widely separated parts of the country, the variety of products (from chlorine to lighter flints, from sodium to gelatine), the fact that each of the principal ones is made not in just one but in several of these factories, the preponderating influence of electric power and the perhaps unusual extent of the technical services which must be given to users of the Division's products.

The article goes on briefly to describe the network of plants and products of which the nerve centre is the Division Headquarters in the Cunard Building overlooking the Liverpool docks. So diverse, however, are the functions of the central control that even here they are not all to be found. Supply and distribution, for example, are concentrated in other headquarter sections at Runcorn, the research department is at Widnes, and the chief engineer's and power departments are at Weston Point, Runcorn.

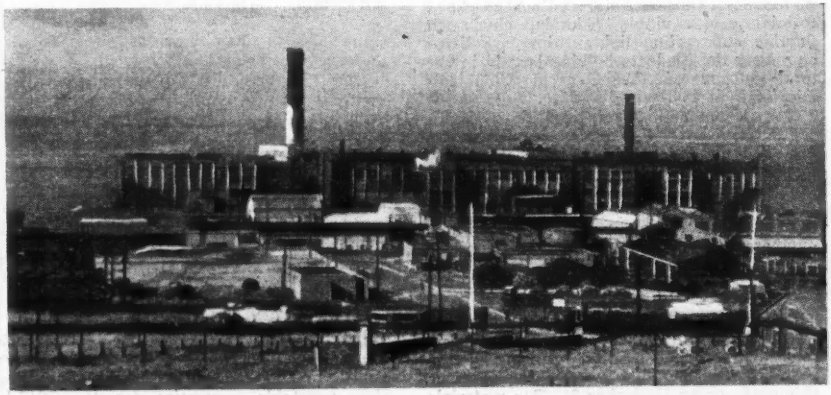
Widnes and Runcorn, formerly the heart of English chemical industry, still contain two-thirds of the division's total factory payroll of nearly 10,000 workers. That area is still the core of I.C.I's chemical structure.

Largest of the chemical works is the Castner Kellner Works at Weston Point, with the largest installation of electrolytic mercury cells in the world. A few miles away are the Rocksavage Works, which, like the Hillhouse and Wade Works in the Fleetwood area, is a former wartime factory operated for the Government and is now wholly under I.C.I. control.

Two Power Stations

The Gaskell-Marsh and Pilkington-Sullivan undertakings in the Widnes area represent the grouping into four factories of more than 12 works which 25 years ago were operating independently in the area. Power for three electrolytic works and other operations in the area is generated by the Division's two main power stations at Weston Point and Widnes, which are now being substantially extended to provide a combined output of more than 130,000 kW.

(*Continued overleaf*)



This represents little more than half of the vast Castner-Kellner installation on the banks of the Mersey, largest unit of the Chemicals Division

C

Other principal plants comprised in the General Chemicals Division are the St. Rollox works at Glasgow (which has been in being for 150 years), Chance and Hunt's at Oldbury and Wednesbury, the Netham works near Bristol, Cassel works on Teesside (in close proximity and association with the big undertaking of the Billingham Division). Two other chemical factories, Randle and Valley, are operated by the Division as agents for the Government.

Notwithstanding the diversity of chemicals produced, the two on which the division is essentially founded are chlorine and sulphuric acid. Chlorine is manufactured by three distinct electrolytic processes by six of the works: by electrolysis of brine in mercury cells at Castner-Kellner, Cassel and Rocksavage works and by electrolysis of brine in diaphragm cells at Pilkington-Sullivan, Hillhouse and Wade works, and, together with metallic sodium, by electrolysis of fused sodium chloride at Castner-Kellner and Cassel.

Chlorine for Bleaching Powder

Much of this chlorine is destined for other industries but still more is devoted to the division's own manufacturing processes, producing bleaching powder, hydrochloric acid, hypochlorites and particularly organic derivatives. Of the latter, trichlorethylene —especially for metal degreasing, drycleaning and solvent extraction—makes the greatest demand on the chlorine supplies.

The principal sources of the other key chemicals are the contact and lead chamber sulphuric acid plants at Gaskell-Marsh, Chance and Hunt and St. Rollox, although these are not the only ones. Sodium cyanide, and insecticides and weed killers, particularly I.C.I's own Gammexane and Methoxane, caustic soda, sodium sulphide, formic acid, vinyl chloride, hydrogen fluoride and cerium lighter flints are listed as among the products bulking largely in the total output of the General Chemicals Division.

The labour problems incidental to chemical enterprise on this scale are necessarily vast and the Personnel and Medical Departments carry a responsibility of even more fundamental importance than the many other executive sections. Nearly all who work in the I.C.I. factories are men—women are outnumbered 20 to 1. "Heavy chemicals manufacture," says the "I.C.I. Magazine," is essentially a man's job."

Indian Import Licences.—Licences for the importation into India of certain non-ferrous metals, which expired on June 30 this year, are automatically revalidated to cover shipments up to December 31. The materials concerned are copper, lead and scrap lead, and aluminium sheets and ingots.

Sulphuric Acid Statistics

Reduced Production in July-September

A SUMMARY of sulphuric acid and oleum production in the U.K. and Eire for the third quarter of this year, just issued by the National Sulphuric Acid Association, Ltd., reveals that production fell from 347,005 tons in the second quarter to 326,182 during the third, the main factor being a drop in the production of chamber-produced acid from 170,710 tons to 149,745 tons. Quantities used were similarly affected, the respective figures being 175,887 tons and 154,119 tons. The figures below exclude Government plants except those producing acid for trade purposes.

Fertilisers represented, as usual, the source of the largest consumption of sulphuric acid and oleum. The Association's analysis of uses shows that the principal were: Superphosphates 94,629 tons, sulphate of ammonia 53,805, rayon and transparent paper 29,698, non pickling and tin plate 20,069, unclassified 18,460, dyestuffs and intermediates 16,727, paint and lithopone 14,912; hydrochloric acid 14,288, mineral oil refining 9345.

	Sulphuric Acid and Oleum		
	Chamber only	Contact only	Chamber and Contact
	Tons of 100% H_2SO_4		
Stock July 1, 1947	36,216	32,092	68,308
Production ...	149,745	176,437	326,182
Receipts	37,208	24,305	61,513
Oleum feed ...	—	2,864	2,864
Adjustments ...	−305	−150	−455
Use	89,723	64,396	154,119
Despatches... ...	100,060	146,436	246,496
Stock Sept. 30, 1947	33,081	24,716	57,797
Total Capacity Represented	222,440	205,390	427,830
Percentage Production	67.3%	85.9%	76.2%

	Raw Materials			
	Pyrites*	Spent Oxide	Sulphur & H_2S	Zinc Concentrates
	tons	tons	tons	tons
Stock July 1, 1947	84,285	149,812	52,563	20,566
Receipts	57,873	53,458	56,566	37,695
Adjustments ...	+233	−760	−441	—
Use	66,262	43,130	51,540	41,010
Despatches ...	35	3,849	151	26
	53†	220†	50†	
Stock Sept. 30, 1947	76,041	155,311	56,947	17,225

* "Receipts" and "Use" include anhydrite "converted" to pyrites.
† Used at works for purposes other than sulphuric acid manufacture.

Less French Potash for Export.—French authorities have decided to allocate more potash to home consumers, thereby reducing the exportable quantities for the 1947-48 period to 240,000 metric tons, a reduction of 50,000 tons on the previous period.

Harnessing Heat From Reaction Vessels

Economies at a Russian Chemical Works

THERE are many chemical reactions that generate considerable quantities of heat. This heat must generally be dissipated and for that purpose cooling water or a flow of cooling gas is often used—notes the *Fuel Effciency News*. It frequently happens that in a single chemical works there are reactions which generate heat and others to which heat must be supplied. Such physical operations as evaporation, distillation, and the preheating of materials also require external heat.

Convenient Heat Exchange

It is very desirable that heat should be circulated from the reactions and operations that evolve heat to those for which additional heat is required. If the two sets of reactions can be combined in one apparatus, so much the better. Unexpected advantages sometimes accrue from the consequent change in works layout as will be seen here.

An interesting example of a works reconstruction based on these principles was recently given in the Russian paper, *Promyshlennaya Energetika*. The author of the article was called upon to reconstruct a works in which steam from the boilers was used in an evaporator to heat a liquid (by indirect heating); a gas was saturated with the vapour from this liquid by being circulated through the evaporator before passing to the reaction vessels. In the reaction vessels so much heat was generated by the chemical reaction that, in spite of water-cooling, parts of the apparatus became red-hot and required frequent replacement. The cooling water was discharged down the drain.

In the reconstructed layout cooling water was passed from a gravity-feed tank through the jackets of the reaction vessels, where it attained a temperature of 90°C. (194°F.). It was then used in place of live steam to supply the necessary heat to the evaporator. From the evaporator the water was discharged to a sump and was then pumped again to the gravity-feed tank for re-use. A by-pass valve on the delivery side of the pump served to regulate the flow of water.

At this works peat is used as fuel, and as a result of the reconstruction here described, 2400 tons of peat a year are stated to have been saved, together with 12 million gallons of water.

Self-Regulating

In addition to the direct saving of materials the new arrangement enabled the thermal conditions of the process to become automatically self-regulating. This is an interesting consequence of the new method of working and comes about in this way. If the temperature becomes reduced in the evaporator because the reaction vessels are running cooler, the process gas picks up less vapour, and the effect in the reaction vessels is such as to cause the temperature there to rise; this rise in temperature increases the temperature of the cooling water, and thus corrects the original irregularity by increasing the rate of evaporation of vapour in the evaporator. The difficult hand-regulation previously needed was thus avoided, with reduction in the number of breakdowns previously caused by the inevitable human factor.

Maintenance Costs Reduced

The more regular operation and the smaller fluctuations of temperature in the vessels resulting from the changed method of working also led to reduced maintenance costs and to a 50 per cent increase in working periods between overhauls The plant output was increased 25 per cent, and experience showed also that the quality of the product was considerably improved so that the proportion of rejects was greatly reduced.

SCIENTIFIC LEASE-LEND

A PLAN to boost the export of scientific laboratory equipment from the United States to other countries, in line with the recent recommendations of the President's Scientific Research Board, has been set in motion through a 2,500,000-dollar revolving fund opened by the United States Export-Import Bank.

While the Bank generally extends credits to increase the productive and export facilities of the borrowing country, this plan is particularly designed to fit the scientific needs of foreign countries. It cannot be applied to American exports indiscriminately, the Bank states.

Pivotal point of the science-export plan is a private organisation of manufacturers and exporters of scientific equipment—the United States Scientific Export Association. From the revolving credit the association will extend loans to its foreign customers for numerous small purchases, with the loans covering a portion of the purchasing price. The credits carry 4½ per cent interest and are repayable within a maximum of five years.

Hydrogenation by Dissociated Ammonia

A PRACTICAL hydrogenation method which successfully used dissociated ammonia as a hydrogenation gas has been developed by Armour & Company, it was disclosed at a recent meeting of the American Oil Chemists' Society in Chicago, Illinois. The process consists of five major steps, as follows :—

1. Conversion of liquid ammonia under pressure to a gas of low pressure.
2. Cracking of the ammonia at a high temperature and low pressure in a retort using a nickel catalyst.
3. Removal of the residual ammonia (0.05 per cent) from the mixture of hydrogen and nitrogen.
4. Compression of the mixed gases.
5. Hydrogenation of fatty materials using the mixed gases.

Lard and cottonseed oil have so far been hydrogenated by this method. Hydrogen consumption figures and hydrogenation rate values have been compared with results obtained from the use of purified steam-iron hydrogen as a control gas. Qualitative hydrogenation has been made of nitriles and fatty acids. Satisfactory yields of primary amines have been obtained from the nitrile hydrogenation, and the fatty acids hydrogenated to iodine values below 5.

The cost of producing hydrogen gas by dissociating ammonia is economically attractive where requirements are not sufficient to warrant more expensive equipment.

Another subject discussed at the same meeting was the hydrogenation of rapeseed oil. This has been subjected to pressure hydrogenation in a small hydrogenator. Various temperatures and pressures have been used, keeping a constant percentage of finely divided nickel catalyst. The progress of the process can be studied by removing supplies periodically, converting them into methyl esters, and fractionation and analysis of the various fractions for unsaturated fatty acids by ultra-violet absorption.

The above method for determining the composition of fatty acid content was also applied with success to a sample of oil extracted from yellow mustard seed from the Punjab.

Hungarian Minerals Monopoly

A virtual State monopoly of the Hungarian mining industry is reflected by the statement from the Hungarian Statistical Office that of the 88 coal mines not less than 82 are State-owned, employ 89.6 per cent of all miners, and produce 91.7 per cent of the total coal production of the country. Of the five iron ore mines three belong to the State, and are responsible for 99.9 per cent of the total production.

Next Week's Events

TUESDAY, NOVEMBER 18

Society of Chemical Industry (Agriculture Group). Physical Chemistry Lecture Theatre, Royal College of Science, Imperial Institute Road, S.W.7, 2.30 p.m. R. S. Cahn : "The Rôle of Chemistry in Recent Developments of Animal Insecticides."—Chemical Engineering Group and Physical Society. Rooms of the Chemical Society, Burlington House, Piccadilly, W.1, 5.30 p.m. P. M. Schuftan : "A New Process for the Separation of Ethylene from Coke Oven Gas."

Royal Society of Arts (Dominions and Colonies Section). John Adam Street, Adelphi, W.C.2, 2.30 p.m. Dr. J. G. Malloch : "Scientific Research in Canada and its Links with Science in the United Kingdom." (Nell Matheson McWharrie Lecture.)

Society of Dyers and Colourists (Scottish Section). St. Enoch Hotel, Glasgow, 7 p.m. Dr. Landolt : "Improvement of the Properties of Fibres and Dyeings by Treatment with Hydrophobic Helamine-Formaldehyde Compounds."—Midlands Section. Victoria Station Hotel, Nottingham, 7 p.m. Dr. E. S. Paice : "Petroleum Chemistry as applied to Textiles."

WEDNESDAY, NOVEMBER 19

Royal Institute of Chemistry (London and S.E. Counties Section). Wellcome Research Institution, 183, Euston Road, N.W.1, 6.30 p.m. Annual general meeting. Scientific Films.

Institution of the Rubber Industry (Southern Section). The Polygon Hotel, Southampton, 7.15 p.m. Mr. F. H. Cotton : "Developments in Processing and Vulcanising Rubber."

THURSDAY, NOVEMBER 20

The Chemical Society. Burlington House, Piccadilly, W.1, 7.30 p.m. H. Mackle and A. R. Ubbelohde : "A Thermo-chemical Evaluation of the Bond-strength in some Carbon Compounds. Part I (Methyl carbon)-iodine and (Methyl carbon)-magnesium,"; G. E. Coates and L. E. Sutton : "The Heats of formation of the N=N and C=N bonds"; D. J. G. Ives and R. W. Pittman : "The Photo-chemistry of Selenium, Part I. The Photo-chemical Oxidation of Hydrogen Selenide."

The Royal Society. Burlington House, Piccadilly, W.1, 2.30 p.m. E. C. Bullard : "The Results of the Heligoland Explosion." 4.30 p.m. Special general meeting.

Society of Chemical Industry (Plastics Group and Road and Building Materials Group). Mansion House, 28, Portland Place, W.1, 6 p.m. V. Evans : "Corrosion-Resistant Cements."

FRIDAY, NOVEMBER 21

Society of Dyers and Colourists (Manchester Section). Gas Department Showrooms, Town Hall Extension, Manchester, 7 p.m. C. P. Tattersfield : "The Effect of Physical Pretreatment on the Ease of Saponification of Cellulose Acetate Rayons and Films."

Royal Institute of Chemistry. Geological Society, Burlington House, W.1, 6 p.m. G. Taylor : "Streatfield Memorial Lecture." (Institute Meeting.)

SATURDAY, NOVEMBER 22

Royal Institute of Chemistry (London and S.E. Counties Section). Brighton Technical College, Brighton, 5.45 p.m. J. G. N. Gaskin : "The Examination of Questioned Documents."

Home News Items

Gas Price Increase.—Gas supplied by the Metropolitan Gas Company is increased by ½d. per therm with effect from Wednesday last.

Change of Address.—The British Rubber Development Board has removed to Market Buildings, Mark Lane, E.C.3.

Beet Problem for Chemists.—The occurrence of an unexpected chemical reaction during the processing of this year's beet crop is reported to have so dislocated manufacturing operations that chemical experts have been consulted.

Retail Sales Rise.—A national survey of retail sales in September last shows that sales by independent chemists—a representative group numbering 227—were 12 per cent higher than in September, 1947. Sales of chemists' wares by large-scale retailers increased 33 per cent.

Resistant Coatings.—Paint and varnish manufacturers since 1789, Denton and Jutsum are renewing their participation at the Building Exhibition after a lapse of many years. Among the company's specialities are anti-corrosive, alkali and acid-resisting paints, and material for freeing rusted and corroded metals, bolts, nuts, screws, bearings, valves and machinery.

Building Plans Suspended.—Plans for the erection of five new factories on the Bromborough Port Industrial Estate, Cheshire, have received a setback owing to the steel shortage. There is little hope of the Ministry of Supply granting licences for four of them because of the requirements of steel in their construction. The fifth, designed to recondition steel drums, may be sanctioned.

Explosion at Iron Works.—Five men and a youth were badly burned, two of them seriously, when half a ton of molten iron which had been poured from a smelting furnace exploded last week, in a vat at the Firhill Iron Works of Shaw and M'Innes, Ltd., Glasgow. Moisture in the vat is believed to have caused the explosion. The metal was being prepared for casting piping for export.

Three Works Fires.—Three serious fires have occurred this week in the Lancashire area: at the I.C.I. works at Barn Naze, near Fleetwood on November 10 when large quantities of packing materials were destroyed; at Brotherton's tar works, Litherland, near Liverpool on November 11, when about 25 tons of tar were consumed; and on November 10 at a very large rubber dump belonging to the N.W. Rubber Co., at Hightown, near Liverpool. In the last-mentioned incident the entire contents of the dump (about 20,000 tons) are believed to be a complete loss.

153,000 Tons More Coal.—Coal production last week totalled 4,243,000 tons, an increase of 153,000 over the previous week. There are now seven weeks left in which to reach the Government's target of 200 millions.

Wholesale Chemical Prices.—Chemicals and oils rose in value to 186.4 (1938 = 100) in October, according to the Board of Trade review of wholesale prices of industrial materials. The index number in September was 183.3 and in the previous month 175.4.

Chemical Export Department.—Aikman (London), Ltd., which for many years has specialised almost exclusively in sales of nitrate of soda and similar nitrogenous products, has opened a new export department for agriculture and industrial chemicals and dyes.

Best Export Total?—Among North-East coast firms with substantial claims for inclusion among Sir Stafford Cripps' export "target busters," is the Washington Chemical Works, where the current production is at a rate equivalent to twice the official target for 1948, and more than three times the 1938 rate. The firm manufactures magnesium products, and claims to be one of the biggest bulk exporters in the area, with about half of present production being shipped overseas.

Detergent and Polish Plant.—R. P. Adam, Ltd., manufacturing chemists of Galashiels, have completed the final stage of a very considerable extension scheme started in 1946. In connection with this expansion, the firm plans the launching of several new products in the polish, detergent, cleaning and allied fields. A 27,000-sq. ft. disused mill has been adapted to form five modern shops designed to produce polishes, cleaners, detergents, chemical preparations, soaps and perfumes. The whole is designed for a straight-flow mechanisation system.

Value of Ambulance Teams.—Presenting St. Andrew's Ambulance Association medals in Glasgow last week to employees who had completed 15 or more years' service, Sir John Craig, chairman of Colvilles, Ltd., expressed the opinion that trained ambulance men were of much greater value in the works than the nurses or the resident doctor that the authorities advised. They were able to render aid at any hour of the day, and neither a nurse nor a doctor could be so readily available. Ten employees—including three brothers—received medals and a gift from the directors of the firm. They are all members of the Advisory Committee of the Dalzell works section.

PERSONAL

MR. F. HAMMOND of the London overseas department has been appointed district manager of Dunlop South Africa, Ltd.

DR. WILLIAM A. HAMOR, of the Mellon Institute, Pittsburgh, Pa., has been appointed editor of the Chemical Monographs of the American Chemical Society.

MR. GERALD STEEL has been appointed joint managing director of United Steel Companies, Ltd., with the chairman SIR WALTER BENTON JONES.

MR. G. E. BEHARRELL, managing director of the Dunlop Rubber Co., Ltd., has been elected president of the Tyre Manufacturers' Conference in succession to the late SIR HAROLD KENWARD.

LORD LEVERHULME, MR. G. A. S. NAIRN (chairman) and other members of Lever Brothers, together with a number of prominent industrialists and works representatives, attended a service at Christ Church, Port Sunlight, on November 2, in memory of Lieut.-Col. Ernest Briggs, the late chairman of Lever Bros. (Port Sunlight), Ltd.

New Fellowships

Among new Fellows elected to the Textile Institute are the following:—

MR. W. VON BERGEN, of New Jersey, U.S.A., who served in the European theatre of war as a scientific consultant to the U.S. Army, and is director of research and laboratories at the Forstmann Woollen Co., Ltd., Passaic, N.J.

DR. B. R. ROBERTS, formerly Professor at Instanbul University, and now group leader at Monsanto Chemical Co., Dayton, Ohio, U.S.A.

MR. H. MARSDEN, of Gatley, Cheshire. Mr. Marsden is sales manager and technical assistant of the Universal Winding Co., Manchester.

Chemical Club Officers

At the annual general meeting of the Chemical Club, held at Whitehall Court, London, recently, the following officers and committee members were elected to serve during the 1947-1948 session:—President, MR. T. H. FAIRBROTHER; chairman of Executive Committee, MR. S. I. LEVY; hon. secretary, MR. A. J. AMOS; hon. treasurer, MR. R. L. STEPHENS.

Committee: MESSRS. E. A. BEVAN, ERIC CHILMAN, H. W. CREMER, W. DIXON, F. A. GREENE, F. J. GRIFFIN, E. H. T. HOBLYN, OSMAN JONES, J. H. ROBERTSON, and J. F. RONCA.

The Council of the Institute of Welding has awarded the Sir William J. Larke Medal and a prize of £50 to MR. J. CORSTON MACKAIN, of Edinburgh, for a paper on the evolution of welded components in house construction and welded bunkers for power houses. Papers submitted by MR. J. R. FERGUSON and DR. H. GOTTFELDT, were highly commended.

MR. G. I. RUSHTON, managing director of Timothy Whites and Taylors, Ltd., and associated companies, has been appointed vice-chairman of the group.

MR. R. C. TERRY, before the war a research chemist of J. & J. Colman, Ltd., and an R.E. and R.A.S.C. officer during the war, has been appointed to the Colonial Service as assistant government chemist at Hong Kong. He graduated M.Sc.

MR. JOHN CUNLIFFE, of Ramsbottom, Lancs., proprietor of the Irwell Chemical Works, Ramsbottom, who died on March 16, aged 74, left estate estimated at £26,206, net personalty £20,437.

PROFESSOR GLENN T. SEABORG, of the University of California, co-discoverer of plutonium, has received the 1948 award of the William H. Nichols Medal of the New York Section of the American Chemical Society.

MR. JOHN WILSON, formerly director of research to the British Rubber Research Association, has been appointed to a similar post with the British Rayon Research Association.

Sir Harold Kenward

A research fellowship in industrial administration is to be founded at St. Catherine's College, Cambridge, as a memorial to SIR HAROLD KENWARD, Dunlop's director of distribution, who died on the *Queen Elizabeth* on his way to America. The trustees are seeking to raise £25,000 to found the memorial.

American Chemist Honoured

Dr. George Washington Carver, the renowned U.S. agricultural chemist who died on January 5, 1943, is to be honoured by an issue of United States postage stamps bearing his portrait. The stamps will be released on January 5, 1948, and a chemist's crucible will appear in the design. Dr. Carver's experiments with agricultural products, especially the peanut and sweet potato from which he derived more than 400 industrial or commercial substances, contributed greatly to economic advancement of several States.

Obituary

MR. WILLIAM M'CONNACHIE, retired analytical chemist, formerly with Coltness Iron Co., Ltd., Glasgow, died on November 4, at Newmains, Glasgow.

American Chemical Notebook

From Our New York Correspondent

AT least one American observer is satisfied that the chemical industry of the U.K. is destined for nationalisation and is sufficiently confident to predict the date. The prophet is Mr. C. C. Concannon, chief, drugs and chemicals division of the Office of International Trade, United States Department of Commerce. Addressing a meeting of the executive committee of the international trade section of the New York Board of Trade a few days ago., he predicted that between 60 and 75 per cent of the British chemical industry would be nationalised by 1950 or 1951. He said immediate nationalisation was ruled out, since it must be preceded by nationalisation of the gas and steel industries. He was doubtful whether Imperial Chemical Industries would ever be nationalised, in spite of the general socialistic character of the Labour Government. "This organisation, which has often been referred to as a monster," he said, "is too well managed to stand in danger of nationalisation shortly and may well escape such a fate permanently." Mr. Concannon, who has recently returned from a tour of eight European countries, said that most encouraging indications of economic recovery are to be found in Belgium, Luxembourg, and the Netherlands. This BENELUX region now had a chemical output of 100 to 125 per cent in excess of prewar levels. By contrast, France's current chemical production stood at only 70 per cent of pre-war. No accurate estmate of production in Germany was possible at the present time.

* * *

Ammonium nitrate fertiliser and trifluorochloroethylene have been added to the list of explosives and other dangerous articles of the Interstate Commerce Commission. The announcement of this in Washington, D.C., this week notes that hereafter a yellow label will be required for ammonium nitrate shipments and the maximum quantity that may be shipped in one outside container by rail express will be 100 lb. Added to the I.C.C. list of dangerous materials were radioactive substances under class Poison D. Specifications have been set up for labelling, packing and shielding, shipping containers, loading and unloading, and the handling by rail freight and express carriers of these materials.

* * *

A U.S. Government-owned patent, No. 2,419,945, covering froth flotation of silica from iron ore has been made available for licensing on a non-exclusive royalty-free basis by the Secretary of the Interior. The patent describes the preparation (for smelting) of iron ore containing calcareous and siliceous impurities. Gangue is floated from the pulverised iron oxide by adding hydrated lime (16.5 to 41.8 lb. per ton) to establish a pulp *p*H of about 12 by substantially saturating the pulp with dissolved lime. An anion-active collecting agent such as tallol or oleic acid is added, and the pulp subjected to agitation and aeration so that the siliceous gangue is floated and the concentrated iron ore recovered in the usual way. The Solicitor, Department of the Interior, Washington 25, D.C., is the authority for licensing.

* * *

"A new chemical industry, based on allyl chloride obtained by the chlorination of propylene, holds promising possibilities," Mr. S. D. Kirkpatrick, past president of the American Institute of Chemical Engineers, told a conference on "Process Equipment" in San Francisco, last week. "From it," he said, "have already come new solvents, the new soil fumigant 'D-D', allyl starches, acrolein, acrylonitriles and, within another year, we shall have synthetic glycerol *via* allyl cloride. "Also in the limelight are two types of development of chemicals from natural gas: the synthol plants using the Fischer-Tropsch process to synthesise motor fuel—at the same time producing a stream of water-soluble oxygenated hydrocarbons, alcohols, aldehydes, ketones, acids, etc.—and the oxidation plants where propane and butane are oxidated catalytically to produce acetaldehyde and many related chemicals."

Atomic Power: 5 or 10 Years ?

VIEWS on the length of time which is likely to elapse before atomic energy is harnessed to industry on a substantial scale were expressed in Liverpool last week on the occasion of the launching of the atomic energy travelling exhibition: PROF. N. F. MOTT (Bristol University): "If the economic conditions of the country are favourable my guess would be in ten years. But we could not do that if we do not have a good coal supply and a flourishing engineering industry."

PROF. H. L. PRYCE (Oxford University): "In five years' time I think there would be running a demonstration power station, to prove that it was possible to convert uranium into electricity. In ten years' time there might be a moderate-sized power station, and in 25 years' time a power station supplying the major proportion of the country with electricity."

PROF. H. W. MASSEY (London): "I entirely agree with the remarks of Professor Pryce."

Overseas News Items

French Coal Output.—Coal production in France during October amounted to 4,625,000 tons, the highest monthly figure this year.

Oil Discovery.—Standard Oil Co. of California has discovered oil 150 miles south-east of Calgary, Canada. The well was drilled jointly with the Imperial Oil Co., Ltd.

Brazilian Petroleum.—A U.S. tender of $2,235,000 has been accepted for the provision in Bahia of a refinery of 2500 barrels daily capacity, which is to be the centre of the petroleum industry in Brazil.

$15,200 Million Industrial Expansion.—American business, exclusive of agriculture, expects to spend a total of $15,200 million for the construction of new plants and the purchase of new equipment. If such planned expenditures are carried out, they will be approximately 25 per cent above the amount spent in 1946, and 85 per cent higher than in 1941.

International Pharmacopoeia.—Arrangements for an international pharmacopoeia have been made at a Geneva meeting of the World Health Organisation of the United Nations and the work will soon be available to the world, stated Dr. C. H. Hampshire, secretary of the Pharmacopoeia Commission, at the dinner of the Pharmaceutical Society of Great Britain.

German Soap-Making Materials.—The Krefeld Urdingen plant of the I.G. Farben and the Chemische Werke of the "Rheinpreusse" mines report that after several months' preparation their output is now expanding. Production of basic materials for pharmaceuticals and coal-tar colours has been scheduled. Manufacture of raw materials for soap and methanol for the pharmaceutical and plastic industries is included in the production plan. The Rheinpreussen Company has also taken up manufacture of soap materials. It is doubtful whether the production of synthetic fats will relieve the scarcity in technical fats.

Electro-Technical Plant Expanding Production.—The industrial combine Elektrotechnisches Kombinat Bitterfeld, Eastern Zone, which improves light metal scrap after a process by Dr. Beck, is now manufacturing spindles, pumps and beds from light metals. The company also manufactures plastics, and is maker of shoes, lampshades, etc., from igelit. Washing materials, caustic soda, potash, soup-cubes, are also made in Bitterfeld, where fertilisers, too, are being produced. In 1948 the firm will take up on a large scale the manufacture of an insecticide to fight colorado beetles. Nearly 12,000 technicians and workers are now employed.

Australian Discovery.—Discovery of a highly radio-active, black resinous mineral in the Hartz Mountains has been reported from Melbourne.

Fewer Casualties.—Industrial injuries in the U.S.A. diminished in the second quarter of this year to 15.7 per million hours worked, the lowest rate for five years. The figure in the same period for 1946 was 18.1.

German Chemical Production.—The chemical manufacturing firm of Schering in the Eastern Zone of Germany, is reported to be once again producing all its pre-war range of patent drugs; penicillin, too, is in production.

Ceylon to Prohibit Rubber Imports.—Among recommendations made recently by the Ceylon Commission for the rubber industry are prohibition of manufactured rubber imports where such articles can be made locally, protective tariffs for certain rubber goods, the establishment of State-aided factories for the manufacture of motor and bicycle tyres, and the setting up of an adequate organisation to undertake rubber research.

Canadian Results.—Commercial Alcohols, Ltd., reports net profit of $69,715 for the year ended March 31, 1947, equal after preferred dividends to 24 cents per share on 200,515 common shares. This compares with $66,992 or 23 cents per common share in the previous year. The report says the year was the most difficult in the company's history. Consolidated net profits of $370,337 are reported by Standard Chemical Co., Ltd., for the year ended March 31, 1947, compared with $287,407 for the previous fiscal year. Provision has been made for preferred dividends of 60 cents a share on common shares outstanding.

Chromium and Aluminium in Rumania.—Chromium ore deposits recently discovered in a south-western province of Rumania, near the Danube, are reported to contain 40-50 per cent of chromium. The total deposits are estimated to hold two million tons. The Rumanian Government is taking steps to eliminate technical and financial difficulties that are hindering the production of aluminium. Up to the present only one firm manufactures aluminium, but it has had to stop production for the time being. Several million tons of aluminium ore, discovered by the Germans during the first world war, are available in the central mountains of Transylvania, but those fields have not yet been exploited. At some places the ore is lying on the surface and it is estimated that it contains 60 per cent aluminium, and 30 per cent iron.

Canadian Caustic and Chlorine Plant.—Construction has started on a new chlorine and caustic soda plant for the Dominion Alkali & Chemical Company, a subsidiary of Dominion Tar & Chemical Co., Ltd., at Beauharnois, Quebec. Initial construction operations will consist of building roads and railroads to the site and erecting a building to serve as offices for construction personnel. The plant, which will have a rated daily production capacity of 60 short tons of chlorine and 67 tons of rayon-grade caustic soda, is expected to be in operation on January 1, 1949. High-strength, rayon-grade caustic soda will be produced without the use of special evaporating equipment.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

JOHNSON AGENCIES (PROPRIETARIES), LTD., Horsham, manufacturing chemists. (M., 15/11/47.) October 15, charge, to Barclays Bank Ltd., securing all moneys due or to become due to the Bank; charged on 32-40 (even) North Street, Horsham. *Nil. December 31, 1941.

Satisfactions

RIO TINTO CO., LTD., London E.C., copper mining company. (M.S., 15/11/47.) Satisfaction October 2, £2,000,000, registered April 30, 1931.

LANGLEY ALLOYS, LTD. (Bucks.). (M.S., 15/11/47.) Satisfactions October 9, of debenture stock registered November 7, 1942, and debentures registered November 22 and December 5, 1946 (all fully).

Company News

Fisons, Ltd., has increased its share capital by the issue of 1,000,000 4½ per cent cumulative preference shares of £1 each at 23s. per share.

The nominal capital of **Foam-Bar, Ltd.**, chemical manufacturers, etc., 131 Baker Street, London, W.1, has been increased beyond the registered capital of £100 by £900, in £1 ordinary shares.

New Companies Registered

Strathclyde Chemical Co., Ltd. (25,859).—Private company. Capital £10,000 in £1 shares. Directors: J. A. Biggart, A. S. Biggart, and W. M. Biggart. Registered office: 105 West George Street, Glasgow, C.2.

Marvos Chemical Manufacturing Company (Luton 1947), Ltd. (444,776).—Private company. Capital £250 in 250 shares of £1 each. Manufacturers of and dealers in chemicals, disinfectants, fertilisers, boot, shoe, furniture, leather and floor polishes, etc. Directors: F. T. Day, and D. W. Gooden. Registered office: 19-20 Grosvenor Place, S.W.1.

Maynard's Chemists, Ltd. (444,723).—Private company. Capital £100 in 100 shares of £1 each. Manufacturing, pharmaceutical, photographic, advising and dispensing chemists and druggists, etc. Directors: G. J. N. Maynard and Winifred G. Maynard, and Kathleen M. Collins. Registered office: 143 Cann Hall Road, Leytonstone, E.11.

Emcer Products, Ltd. (444,757).—Private company. Capital £2625 in 2500 "A" shares of £1 and 2500 "B" shares of 1s. Manufacturers of and dealers in dyes, dyestuffs, pigments, auxiliaries for piece goods and textiles, finishing and softening materials, chemicals, chemical and other products, etc. Directors: S. Bradley and J. Bradley, S. Arnold, and C. G. Badrick. Registered office: Palmerston House, Bishopsgate, E.C.

Chemical and Allied Stocks and Shares

ALTHOUGH Budget uncertainties further restricted business at the beginning of the week, British Funds remained firm on the assumption that Mr. Dalton's proposals will have the effect of boosting gilt-edged stocks. Industrial shares must now be expected to undergo a period of adjustment to the implications of the Budget, although it is not easy to assess how the incidence of taxation will bear on individual companies. The latest coal output figures created an excellent impression, particularly as this follows a record rate of steel production. It is realised that coal and steel are the main factors than can combat the economic crisis and speed the export drive.

As was to be expected, chemical and kindred shares moved closely with the general trend in industrials, but on balance were mostly within a few pence of the levels current a week ago. There are now two relatively unknown factors which must have an important bearing on future financial results, namely, the incidence of taxation and the extent to which individual companies can reach their targets. Nevertheless, despite these uncertainties there has not

been much selling. It is realised that selling of leading chemical and kindred shares would have little in its favour because of the difficulty of obtaining alternative investments with as good possibilities and prospects. The chemical industry must play an important part in export trade as well as at home, and so far as can be judged, in most cases there seem reasonable prospects of dividends being maintained. Imperial Chemical eased to 47s. 7½d., but were later 48s. 6d., and now yield 4⅛ per cent on the 10 per cent total dividend which is generally expected to be maintained. Fisons remained steady at 64s. 4½d., helped by the statement in the prospectus issued in connection with the issue of 4½ per cent preference shares, that profits for the nine months to June compare favourably with those of last year. It is added that production of all kinds of chemical fertilisers is running strongly, and the needs of agriculturists at home and overseas are still far from being satisfied. British Glues & Chemicals 4s. ordinary shares have strengthened to 20s. 9d. W. J. Bush were 82s. 6d., and B. Laporte 83s., while elsewhere, Major & Co.'s 2s. shares have changed hands around 2s. 9d., and Lawes Chemical were 13s. In response to market dividend estimates which range up to 100 per cent (compared with the previous year's 80 per cent) Blythe Colour 4s. shares have risen to 60s. Elsewhere, however, Levers receded to 51s., Turner & Newall were 73s. 1½d., and Dunlop Rubber at 71s. 9d. lost part of an earlier rise. United Molasses eased to 47s. prior to the Budget, but Wall Paper Manufacturers deferred were better at 43s. 9d. British Aluminium strengthened to 47s. 3d., and Imperial Smelting further improved to 21s. 3d. In the paint section, Lewis Berger changed hands up to close on £8 on higher dividend hopes, while Pinchin Johnson (56s.) were higher on balance.

The latest coal production figures maintained firmness in iron and steels, where Dorman Long were good at 27s. 6d. in view of the company's big Tees-side plans. Whitehead Iron at £5¾ strengthened following the unchanged interim dividend, while United Steel 26s. 6d., Colvilles 28s., Guest Keen 47s. 9d. all recorded further gains. In other directions, Courtaulds eased to 43s. 9d., and textiles generally were dull, it being realised that achievement of export targets depends on an adequate flow of labour to the mills. Boots Drug at 55s. 9d. were little changed on balance, but elsewhere, Beechams deferred eased to 22s. Tube Investments strengthened to £6⅝ pending the dividend announcement, but Triplex Glass (32s. 9d.) failed to hold all an earlier improvement. Oils were more active, with Shell better at 76s. 10½d., awaiting the new issue terms. Apex (Trinidad) rose to 42s. in response to higher dividend hopes.

British Chemical Prices

Market Reports

ACTIVE trading conditions have been reported from most sections of the industrial chemicals market with contract deliveries well up to schedule. A good volume of inquiries for new business is also reported although in some instances definite shortage of suitable containers continues to hamper the export of both heavy and fine chemicals; it is hoped that some improvement in the position will result from the representation made by the trade associations. The general situation as far as supplies are concerned has not worsened, but much leeway has yet to be made up if home and overseas requirements are to be fully met. The white and red leads are in good call at unchanged rates, while there is a good demand for acetone, formaldehyde and the heavy acids. Among the soda products, caustic soda, bicarbonate of soda and soda ash are in active request, and values throughout this section are well held. Demands for the potash products remain in excess of available supplies. There are no new features in the coal-tar products market, and most items in this section are well covered by forward bookings.

MANCHESTER.—Sellers of heavy and other descriptions of chemical products seem to be increasingly disposed to adopt a cautious attitude in regard to fresh booking and, so far as the Manchester market is concerned, additional business in most sections is less a matter of what buyers are ready to place than of what sellers are ready to accept. In the meantime, prices are very firm in almost all departments. Industrial users generally, including the textile and allied trades, are specifying for steady deliveries against old orders. A fair trade is passing in fertiliser materials, with basic slag, lime and superphosphates probably the busiest sections. Tar products generally, both light and heavy, are in good demand.

GLASGOW.—All grades of light and heavy chemicals showed activity last week in the Scottish chemical market. Prices are still tending to rise, the increase in the main being a reflection of increased freight rates and cost of packages. There are indications that there will be a shortage of bleaching powder, although most large users have reasonable stocks at the moment. There is still a considerable demand for substitute materials. In the export market shortage of suitable packages is still causing anxiety and delay in delivery. Trade with Greece has been restricted due to financial regulations, but it is believed that the position is now easing. Great difficulty is still being experienced by buyers in Spain in obtaining import licences. Firm orders have again been received on about the average scale, and inquiries remain numerous.

Patents in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each.

Complete Specifications Open to Public Inspection

Process for the separation of carbonates of magnesium and calcium.—Basic Refractories Inc. May 8, 1943. 15040/1945.

Manufacture of copper base alloy products.—Bridgeport Brass Co. July 15, 1942. 23219/1944.

Cellulose ether derivatives, and process for producing the same.—Carbide & Carbon Chemicals Corporation. Oct. 19, 1940. 14240-41/1941.

Manufacture of azo-dyestuffs.—Ciba, Ltd. March 1, 1946. 5796-97/1947.

Manufacture of tetrahydrophenanthrene carboxylic acids and derivatives thereof.—Ciba, Ltd. March 7, 1946. 6227-9/1947.

Manufacture of hydrophenanthrene monocarboxylic acids and derivatives thereof.—Ciba, Ltd. March 7, 1946. 6334-6/1947.

Manufacture of rosin-styrene interpolymers.—Dow Chemical Co. March 1, 1946. 4562/1947.

Coating compositions.—E.I. Du Pont de Nemours & Co. March 2, 1946. 5805/1947.

Manufacture of halogenated acrylic acids.—E.I. Du Pont de Nemours & Co. March 4, 1946. 6123/1947.

Production of polymeric materials.—E.I. Du Pont de Nemours & Co. March 4, 1946. 6124/1947.

Production of fluorinated carboxylic acids.—E.I. Du Pont de Nemours & Co. March 7, 1946. 6425/1947.

Production of phosphoric esters.—Eastman Kodak Co. Dec. 8, 1943. 21968/1947.

Polymeric material and process of producing same.—B. F. Goodrich Co. March 2, 1946. 5293/1947.

Electrolytic apparatus.—I.C.I., Ltd.—March 2, 1946. 5981/1947.

Treatment of cellulosic materials with polyisocyanates and polyisothiocyanates.—I.C.I., Ltd. Feb. 27, 1942. 21961/1947.

Modifying the properties of organic substances with polyisocyanates, polyisothiocyanates, etc.—I.C.I., Ltd. May 24, 1939. 21962/1947.

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Acetylene compounds.—Koppers Co., Inc. Feb. 7, 1946. 20360/1946.

Acetylene compound.—Koppers Co., Inc. Feb. 7, 1946. 20361/1946.

Chemical processes and products.—Merck & Co., Inc. March 2, 1946. 4966/1947.

Processes of preparing new organic compounds of silicon and the compounds resulting from said processes.—Minnesota Mining & Manufacturing Co. Dec. 31, 1942. 21863/1947.

Production of N, N-diakylamino alcohols.—Monsanto Chemical Co. Oct. 29, 1942. 16696/1944.

Detergents and processes of preparing the same.—Monsanto Chemical Co. May 14, 1940. 17868/1944.

Process for the complete or substantial removal of free acid from mixtures containing free acid and acid alkyl esters.—N.V. de Bataafsche Petroleum Maatschappij. Oct. 19, 1939. 22449/1947.

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AMENDMENT OF PATENT

Notice is given that John Allan seeks leave to amend the Specification of the Application for Letters Patent No. 590,167 entitled "Improvements in or relating to moulded products with reinforcement of filamentary material."

Particulars of the proposed amendment were set forth in the Official Journal (Patents) No. 3064 dated November 5th, 1947.

Any person may give Notice of Opposition to the amendment by leaving Patents Form No. 19 at the Patent Office, 25, Southampton Buildings, London, W.C.2, on or before the 5th December, 1947.

H. L. SAUNDERS,
Comptroller-General.

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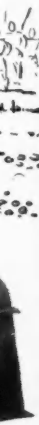

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